STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.:	MO-0118877
Owner:	Johnson County Egg Farm, LLC
Address:	1275 Southwest Y Highway, Knob Noster, MO 65336
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Johnson County Egg Farm
Address:	1275 Southwest Y Highway, Knob Noster, MO 65336
Legal Description:	See Attached
Receiving Stream & Basin:	See Attached (Lamine River) (10300103-05-02)

is authorized to discharge from the operation described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfalls #001 - 013 – Animal Waste – SIC #0252
No Discharge – CAFO Class 1A
One 3 cell earthen storage basin/six concrete storage pits/one dead animal composter/land application system/egg wash water/truck wash/storm water runoff/domestic wastewater piped to cell #1/two 2-story buildings over concrete pits.
Design population equivalent is 165,870.
Design flow is 62,285 gallons/day (0.0623 MGD). 22,734,025 gallons/year
Design biosolids is 374,815 cu.ft./year. 6,372 tons per year.
Design number of animals is 1,940,000 Layer Hens (64,667 animal units).

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

August 11, 2000 — Effective Date
July 23, 2004 — Revised

Stephen M. Mahfood, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

August 10, 2005 — Expiration Date

Jim Hull, Director of Staff, Clean Water Commission

MO 780-0041 (10-93)

OPERATION DESCRIPTION (continued)

Total Number of Useable Acres Available for Land Application (excluding buffer zones):

Percent Slope	Land Owned by Permittee	Land with Spreading Agreements	Total Acres
0-10%	1,150	17,700	18,850

FACILITY DESCRIPTION
The poultry egg laying operation consists of twelve confinement buildings, each containing 120,000 birds, two 2-story buildings over concrete pits each containing 250,000 birds, an egg processing building, dead animal composting building, a truck maintenance building, an office building, a feed mill and an employees break building. Wastes from twelve buildings are collected and stored in a three-cell earthen storage basin and 6 concrete pits. All domestic wastes from the facilities employees and the wastes from the egg processing and truck wash maintenance buildings are piped to the three cell earthen storage basin. Contaminated storm water from the production buildings and feed mill is diverted to the 3-cell storage basin. Uncontaminated storm water is diverted to a fresh water earthen storage basin.

Waste from buildings 13 and 14 are removed from the buildings approximately every 18 to 24 months and are land applied at rates calculated using the PAN approach. Wastes are removed from the poultry confinement buildings using a mechanical scraper. The poultry wastes are scraped into a concrete collection gutter at the end of the confinement buildings and then augured out of the confinement buildings into concrete manure storage pits. Each existing pit serves two confinement buildings. Wastes from the manure storage pits are pumped to the three-cell earthen storage basin when weather conditions prevent land application of manure. The lagoon currently receives approximately 60% of the manure wastes produced by the birds. Approximately 40% of the manure wastes are land applied from the concrete manure storage pits. Wastes are removed from the storage pits and land applied by subsurface injection or surface application. Wastes from the storage basin are land applied by four center pivot irrigation systems. Existing underground supply lines located north of cell #3 have connection risers at land application sites not owned by the permittee.

Outfall #001 - System Type: 6 concrete manure pits/land application/storm water runoff.
Legal Description: SE ¼, Sec. 1, T45N, R24W, Johnson County.
Design Storage: 13 days.
Maximum Operating Level (Safety Volume Depth): one foot below overflow level.
Minimum Operating Level: 10 feet below overflow level.
Land Application: Rates are based on the plant available nitrogen approach.
The concrete pits receive manure from the production buildings. Manure that cannot be land applied from the pits is pumped into the storage basin at Outfall #002.

Outfall #002 - System Type: Three-cell earthen storage basin/land application/storm water runoff/truck wash and maintenance/egg wash water/domestic wastewater.
Legal Description: SE ¼, Sec. 1, T45N, R24W, Johnson County.
Design Storage: 365 days (22,734,000 gallons storage capacity).
Maximum Operating Level (Safety Volume Depth): one foot below overflow level.

Minimum Operating Level for 365 days storage	Storage Volume for 365 days
Cell #1 - 2 feet below overflow level.	0
Cell #2 – 8 feet below overflow level.	11,367,000 gallons
Cell #3 – 8 feet below overflow level.	11,367,000 gallons

Land Application: Rates are based on the plant available nitrogen approach.
The storage basin receives manure, egg washwater, and domestic wastewater from employee restrooms, break room, and showers.

Lagoon	Total Depth	Total Volume
Cell #1	16 feet	6,018,048 cubic feet
Cell #2	15 feet	2,804,700 cubic feet
Cell #3	19 feet	3,541,809 cubic feet

OPERATION DESCRIPTION (continued)

Existing design flows for Outfall #001 and #002 are:
Domestic wastewater is 3,000 gallons/day.
Egg washwater is 4,500 gallons/day.
Manure production is 26,300 gallons/day.
Rainfall onto storage basins is 28,485 gallons/day (1-in-10 year flows).
Total design flow is 62,285 gallons/day.

Outfall #003 – Stream Monitoring – Upstream
Legal Description: NW ¼, SW ¼, NW ¼, Sec. 1, T45N, R24W, Johnson County, Long Branch at property line.

Outfall #004 – Storm Water
Legal Description: NW ¼, NW ¼, SE ¼, Sec. 1, T45N, R24W, Johnson County, Unnamed Tributary to Long Branch at property line.

Outfall #005 – Stream Monitoring
Legal Description: NE ¼, NE ¼, SW ¼, Sec. 6, T45N, R23W, Pettis County, Long Branch at property line.

Outfall #006 – Storm Water
Legal Description: NE ¼, NE ¼, NW ¼, Sec. 7, T45N, R23W, Pettis County, Unnamed Tributary to Long Branch at Highway y.

Outfall #007 – Storm Water – Upstream
Legal Description: SW ¼, SE ¼, NW ¼, Sec. 7, T45N, R23W, Pettis County, Unnamed Tributary to Long Branch at property line.

Outfall #008 – Storm Water
Legal Description: SE ¼, SE ¼, NW ¼, Sec. 12, T45N, R24W, Johnson County, Unnamed Tributary to Long Branch at property line.

Outfall #009 – Storm Water
Legal Description: NE ¼, NE ¼, NE ¼, Sec. 11, T45N, R24W, Johnson County, Unnamed Tributary to Long Branch at property line.

Outfall #010 – Storm Water
Legal Description: NE ¼, NE ¼, SE ¼, Sec. 1, T45N, R24W, Johnson County, Drainage Ditch north of lagoon.

Outfall #011 – Stream Monitoring
Legal Description: SW ¼, NW ¼, SW ¼, Sec. 3, T45N, R23W, Pettis County, Muddy Creek at Highway Y at property line.

Outfall #012 – Stream Monitoring
Legal Description: NE ¼, NE ¼, NW ¼, Sec. 35, T46N, R23W, Pettis County, Muddy Creek at Highway 127.

Outfall #013 – Proposed Construction: Buildings 13 and 14. Two 2-story buildings over concrete pits
Legal Description: SE ¼, Sec. 1, T45N, R24W, Johnson County
Design Number of Animals: 500,000 (250,000 each house)
Biosolids Volume: 374,815 cu.ft./yr. 6,372 tons per year
Design storage: 545 days
Total pit depth: 9 feet above bottom of pits
Upper Operating Level: 5 feet above bottom of pits
Land Application: Rates are based on the plant available nitrogen approach

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfalls #001 - #013 – Emergency Wastewater Discharge (Notes 1 & 2)						
Flow	MGD	*		*	once/day**	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L	*		*	once/day**	grab
Ammonia Nitrogen as N	mg/L	*		*	once/day**	grab
Outfalls #001, #002 - #013 – Nutrient Monitoring For Land Application (Note 3)						
Total Kjeldahl Nitrogen as N	mg/L	*		*	Note 3	Note 3
Ammonia Nitrogen as N	mg/L	*		*	Note 3	Note 3
Total Phosphorus as P	mg/L	*		*	Note 3	Note 3
Dissolved Phosphorus as P	mg/L	*		*	Note 3	Note 3
Percent Moisture Content	%	*		*	Note 3	Note 3
Outfalls #001, #002 - #013 – Land Application Operational Monitoring (Notes 4 & 5)						
Lagoon or Storage Structure Freeboard	feet	Note 4		Note 5	once/month	measured
Land Application	hours	Note 5			daily	total
Amount Land Applied	gallons or cubic feet	Note 5			daily	total
Application Area	acres	Note 5			daily	total
Application Rate	inches/ acre	Note 5			daily	total
Rainfall	inches	*			daily	total

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE October 28, 2004. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfalls #003 - #012 - Storm Water Runoff (Note 6)						
Flow	MGD	*			4/year***	24 hr. estimate
pH - Units	SU	*			4/year***	grab
Ammonia Nitrogen as N	mg/L	*			4/year***	grab
Total Suspended Solids	mg/L	*			4/year***	grab
Total Phosphorus as P	mg/L	*			4/year***	grab
Dissolved Phosphorus as P	mg/L	*			4/year***	grab
Temperature	°C	*			4/year***	grab
Outfalls #003, #005, #011 & #012 - Stream Monitoring (Note 7)						
Flow	MGD	*			Note 7	24 hr. estimate
pH - Units	SU	*			Note 7	grab
Ammonia Nitrogen as N	mg/L	*			Note 7	grab
Nitrate/Nitrite Nitrogen as N	mg/L	*			Note 7	grab
Temperature	°C	*			Note 7	grab

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B. STANDARD CONDITIONS

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A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only (see Special Conditions).
** Monitor only when discharge occurs.
*** Sample four (4) times per year at two or three month intervals between March 1 and November 30.

Note 1 - No-Discharge Requirements. See Special Condition #2.
Note 2 - Wastewater discharge monitoring. See Special Condition #3.
Note 3 - Nutrient monitoring for land application. See Special Condition #4.
Note 4 - Report the water level as feet below the emergency overflow level and the 2-story buildings as feet above bottom of pits.
Note 5 - Land Application operational monitoring. See Special Condition #5.
Note 6 - Storm water runoff monitoring. See Special Condition #6.
Note 7 - Stream Monitoring Requirements. Sample from the stream once/month in the months of March through November. Collect samples from the stream during dry weather flows when there is not direct storm water runoff into the stream. This monitoring is in addition to the storm water runoff monitoring for these monitoring locations.

C. SPECIAL CONDITIONS

1. Water Quality Standards
   a. Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031.
   b. General Criteria
      The following water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
      (1) Waters shall be free from substances in sufficient amounts to cause the formation or putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
      (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
      (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
      (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal, or aquatic life;
      (5) There shall be no significant human health hazard from incidental contact with the water;
      (6) There shall be no acute toxicity to livestock or wildlife watering;
      (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
      (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri s Solid Waste Law, section 260.200, RSMo, except as the use of such material is specifically permitted pursuant to section 260.200-260.247.

2. No-Discharge Requirement
   The permittee shall land apply wastewater on suitable days as needed to keep the storage structure within design operating levels. The storage shall be maintained as near to the minimum operating level (maximum storage capacity) as practicable so as to provide capacity for process wastewater flows plus the 1-in-10-year chronic rainfall and the 25-year-24-hour rainfall based on the design storage period listed in the operation description. There shall be no-discharge of process waste during dry weather conditions when soils are suitable for irrigation. For a properly operated operation, discharge is allowed by overflow through the emergency spillway of the storage structure due to storm events exceeding the chronic or catastrophic storm events for the design storage period and only when irrigation is not feasible. Process waste discharge is not allowed by pumping, siphoning, cutting of berms, irrigation runoff, or any other method, except as authorized herein. Permittee shall make every reasonable effort to cease discharge as soon as soil conditions are suitable for irrigation.

3. Wastewater Discharge Monitoring (All Outfalls - See Section A)
   a. Any emergency wastewater discharge or unauthorized discharge of process wastewater that occurs due to storage structure overflow, wastewater bypassing, manure stockpiles, land application or other sources shall be monitored once/day for ammonia nitrogen as N and biochemical oxygen demand (BOD_5).
   b. Samples shall be collected of the discharge at the downgradient property boundary. Samples shall also be collected from any defined drainage that are above and below the receiving waters at the downgradient property boundary. If the receiving drainage is dry above the discharge point, report as no stream flow above the discharge point.
   c. Records shall be maintained for time, date, location, and duration of the discharge and an estimate of the discharge volume.
   d. Notify the department as soon as possible and no later than within 24 hours of any discharge that occurs and submit monitoring results within 30 days.

C. SPECIAL CONDITIONS (continued)

4. Nutrient Monitoring for Land Application (See Section A)
   a. Wastewater from each lagoon cell and concrete storage basin shall be sampled and tested at least nine (9) times/year at regular intervals between March 1 and November 30. Samples shall be tested for Total Kjeldahl nitrogen as N, ammonia nitrogen as N, total phosphorus as P, dissolved phosphorus as P, and percent moisture content. Each sample shall be a composite sample consisting of at least seven (7) grab samples. Samples should be collected at regular location intervals and regular depth intervals between the minimum and maximum operating levels that will represent the wastewater to be land applied during each land application period.
   b. Solids, sludges or composts shall be sampled and tested separately. At least one composite sample shall be collected for each month when land application occurs. Each composite sample shall consist of at least 20 grab samples. Solids and sludges shall be tested for total Kjeldahl nitrogen as N, ammonia nitrogen as N, total phosphorus as P, and total suspended solids.

5. Land Application - Operational Monitoring (See Section A)
   a. The inches of precipitation received at the production site shall be recorded daily and shall be reported quarterly for daily amounts, monthly totals, and cumulative total.
   b. Daily records shall be kept on file by each field and tract for land application locations, volumes, acres, inches/hour, inches/acre, time of applications, and which storage structure was being pumped. These shall be summarized in the quarterly and annual reports. Daily totals shall be kept on file by permittee and cumulative amounts submitted quarterly and in the annual report.
   c. Monthly measurements shall be made of the water level in each storage structure and shall be recorded as feet below the emergency overflow elevation. Report quarterly.
   d. Nitrogen application rates, crop yields, crop nitrogen requirements, and other operational monitoring shall be recorded for each field and reported in the annual report.

6. Storm Water Runoff Monitoring (See Section A)
   a. Samples required in this paragraph shall be collected at the storm water monitoring locations listed in Section A of this permit.
   b. Storm water runoff shall be monitored 4 times/year for ammonia nitrogen as N, total suspended solids, total phosphorus as P, dissolved phosphorus as P, pH, and temperature.
   c. Samples shall be collected during storm water runoff events that occur after rainfalls of at least 0.5 inch within a 24 hour period. Collect the sample as soon as practicable after the beginning of storm water runoff.
   d. If there are no runoff events during a monitoring period, report as no discharge of storm water.
   e. A storm water runoff event is defined as a 24 hour period after the start of runoff. Runoff occurring after that will be considered as a separate runoff event.
   f. Monitoring is required for watersheds where process waste has been land applied within the last 12 months. If there has been no land application within a watershed for the previous 12 months, the Monitoring report shall specify “Monitoring not required due to no land application within the last 12 months”.

7. Soil Monitoring
   a. Composite soil samples shall be collected for the surface 6 inches of soil (0-6 inch depth) for all sites where land application has occurred within the last 12 months and where land application will occur within the next 12 months.
   b. Nitrate nitrogen as N shall be tested twice per year in spring and fall. Soil samples may be collected for the top 0-6 or 0-12 inches or more.

C. SPECIAL CONDITIONS (continued)

7. Soil Monitoring (continued)

c. Soil pH, percent organic matter, cation exchange capacity, exchangeable sodium percentage and available phosphorus as P (Bray P-1 test method) shall be sampled prior to land application and once every three (3) years thereafter, unless no additional land application has occurred at the site.
d. Soil sampling shall be in accordance with University of Missouri (MU) publication G9110, "Sampling Your Soil For Testing" or other methods approved by the department.
e. Soil testing methods shall be in accordance with North Dakota Agricultural Experiment Bulletin 499-Revised, "Recommended Chemical Soil Test Procedures for the North Central Region" or other test methods approved by the department. Soil textural classes shall be based on USDA Soil Taxonomy.
f. The annual report shall include a summary of the soil test results for each field.

8. Testing Methods
In field testing methods or other approved methods may be used for storm water and in-stream monitoring under this permit.

9. Required Notification of Releases
a. Any wastewater discharge into waters of the state shall be reported to the Department as soon as possible and no later than 24 hours after the start of the discharge.
b. Spills or leaks that are contained on the property shall also be reported to the Department within 24 hours, if the flow exceeds 1,000 gallons per day. This includes leaks from sewer lines, recycle lines, flushing systems, storage structures or land application systems.

10. Annual Report
An annual report is required in addition to the quarterly reporting under Section A of this permit. The annual report shall be submitted by January 28 of each year for the previous growing season from October 1 through September 30 or an alternate 12 month period approved by the Department and listed in the Operation and Maintenance Manual. This report shall be submitted using report forms approved by the Department and shall include a summary of the monitoring and record keeping required by the Special Conditions and Standard Conditions of this permit.

11. Operation Description
a. This permit authorizes operation of the system as indicated in the Operation Description of this permit.
b. The system listed in the operation description of this permit shall not be placed into operation until submittal of the engineering certification of completed construction and approval by the department. Barrel tests to determine lagoon leakage rates shall be conducted on all newly constructed lagoons in accordance with 10 CSR 20-8.020 (16) (B) and shall be submitted with the engineering certification of completed construction. The department shall be notified at least seven (7) days prior to the barrel testing dates to allow observation of the tests.

12. Design Capacity
Permittee shall not exceed the design capacity information listed in the Operation Description Section of this permit. Any proposed increases must be reported in accordance with Standard Conditions Part I, Section B, Paragraph 1., and may require a permit modification prior to the proposed change.

C. SPECIAL CONDITIONS (continued)

12. Design Capacity (continued)

a. Design Population Equivalent: The Design Population Equivalent is the human equivalent based on the annual average daily pounds of animals at the design capacity listed in the permit application. The average daily pounds of animals multiplied by a standard conversion factor equals the Design (human) Population Equivalent. The conversion factors are: 0.015 swine, 0.014 beef; 0.020 dairy; 0.030 laying hen; 0.040 turkey; and 0.05 poultry broiler.
b. Design Flow: The design flow in gallons per day is based on the maximum annual flows including storm water flows during the one-in-ten year return frequency for annual or 365 day rainfall minus evaporation. The flow is based on the time period when the flows are generated at the production site and not when flows are land applied. Any excess flow may be stored and carried over into the following year for land application, as necessary. Permittee may exceed the design flow when precipitation in any 365 day period exceeds the one-in-ten year annual precipitation amount.
c. Animal Units: Animal Units are based on the maximum number and weight of animals at design capacity of the animal confinement buildings and lot areas.
d. Reporting Requirements: The actual operation numbers compared to the permitted design capacity shall be summarized in the annual report.

13. Construction Permits
All wastewater systems shall be constructed in accordance with a construction permit, except where exempted by state regulations under 10 CSR 20-6.300.

14. Emergency Spillways
All earthen storage basins shall have emergency spillways maintained as shown on the approved construction plans or approved as-built specifications.

15. HB1207
Permittee shall maintain compliance with all applicable provisions of state law under 640.725 to 640.735 RSMo, Supp.1996 (HB1207).

16. Reopener Clause
This permit may be reopened and modified or alternatively revoked and reissued, to incorporate new or modified limitations or other conditions pertaining to phosphorus application rates to soils, the adequacy of liners in earthen storage basins, or other special conditions as may be necessary to protect waters of the state.

17. Best Management Practices
The permittee shall follow the attached Best Management Practices (BMP) for CAFO dated February 16, 1996, which are hereby incorporated as though fully set forth herein. Exceptions for BMP’s may be approved on a case-by-case basis by the permitting authority and must be listed in the permit in accordance with public participation and permit modification rules under 10 CSR 20, Chapter 6.

18. Land Application Site Locations
The permittee shall land apply process wastes only to suitable sites located within the overall property boundaries and descriptions listed in the permit application and associated operation plans. Permittee requests for additional sites including non-owned property must follow permit modification procedures prior to land application.

19. Land Application Limitations
a. Process wastes should be land applied as close as practicable to when plants will utilize nutrients. Fall application for the spring crop season may be used where appropriate, but should not be the primary application period. Process wastes should be utilized as a nutrient resource.

C. SPECIAL CONDITIONS (continued)

19. Land Application Limitations (continued)

b. Avoid application or reduce application rates and modify application practices when there is a local, applicable weather forecast or observation by permittee of an imminent or impending storm event.
c. Land application shall cease as soon as practicable upon occurrence of any precipitation.
d. Land application equipment shall be operated in such a manner that wastes do not reach an adjoining property line. Rigorous inspection procedures shall be implemented for insuring that no visual spray drifts across public roads, property boundaries, or surface water sources. If the employee detects wind blown mist within 50 feet of an adjoining property line, public roadway, or surface water source, the application equipment shall be either moved further way or shut down.

20. Field Slopes for Land Application
Surface application rates on field slopes between 10 to 20 percent shall not exceed 0.25 inch/hour and 0.5 inch/day. Permittee may land apply process wastes on these field slopes only after submitting a revised O&M Manual for achieving the above application rates and receiving prior approval from the department. The O&M plan shall include a topographic map showing slopes, drainage patterns and soils information. The number of acres approved for various slope conditions are listed in the operation/operation description section of this permit.

21. Subsurface Injection
Subsurface Injection of wastes shall be used to the extent practicable on land application sites not owned by the permittee. Surface application is allowed on those sites designated in the permit application.

22. Nitrogen Management
a. The permittee shall not exceed the plant available nitrogen management approach as listed in this permit.
b. The actual application rates for a given year or growing season must be adjusted based on the approved management approach and the actual process wastes and soil testing results and crop nitrogen requirement. If crop yields are less than that predicted in the permit application, the application rates must be reduced or the yields increased through appropriate changes in management practices.
c. Application to pasture land shall not exceed an approved plant available nitrogen rate based on actual cow days on pasture.

23. Plant Available Nitrogen Procedure
a. The Plant Available Nitrogen (PAN) method predicts the typical amount of nitrogen that is expected to be available to plants based on the median or average values from the reference publications listed herein. Actual nitrogen available to plants during a growing season may be more or less than the predicted values due to climatic variations. Supplemental nitrogen applications during the growing season may be added to correct plant deficiencies. Wastewater, sludge and fertilizer nitrogen applications shall be based upon crop nitrogen requirements based on realistic crop yield goals. The wastewater application rate shall be calculated as follows:

PAN = CNR - SRN – CFN

WHERE: **CFN** = Commercial Fertilizer Nitrogen applied in pounds N/acre.
CNR = Crop Nitrogen Requirement in pounds N/acre
PAN = Plant Available Nitrogen in wastewater and sludges expressed as annual pounds N/acre.
SRN = Soil Residual Nitrogen in pounds N/acre.

C. SPECIAL CONDITIONS (continued)

23. Plant Available Nitrogen Procedure (continued)

b. Plant Available Nitrogen(PAN) is calculated as follows:

PAN = [Ammonia Nitrogen] x [Availability Factor]
+ [Organic Nitrogen] x [Availability Factor]
+ [Nitrate Nitrogen] x [Availability Factor]

Note: For anaerobic treated wastewater and sludges, the nitrate nitrogen amounts will be negligible and can be ignored.

c. Plant Available Nitrogen (PAN) Availability factors for wastewater and sludges are as follows:

1. Average availability factors for all fields:

Type of Nitrogen	Surface Application	Immediate Incorporation or Subsurface Injection
Organic	0.25 - 0.75*	0.25 - 0.75*
Ammonia	0.6**	0.9**
Nitrate	0.9**	0.9**

***** Organic Nitrogen = [Total Kjeldahl Nitrogen as N] - [Ammonia as N]. Availability Factors based on time after application and waste type are:

Type of Manure by Animal Type and Waste Storage Method	Availability Factor by Time Period Year 1	Year 2	Year 3	Cumulative Year 3+
Anaerobic Lagoons (all animals/poultry)	0.35	0.18	0.09	0.62
Liquid storage basins (except poultry)	0.35	0.18	0.09	0.62
Poultry - storage basins and dry litter	0.60	0.10	0.05	0.75
Manure solids – beef, dairy, swine				
without bedding	0.35	0.18	0.09	0.62
with bedding	0.25	0.13	0.07	0.45

NOTES: Year 1 is the current year of manure application; year 2 is the previous year of manure application; and year 3 is manure application two years ago. Nitrogen availability for years 1, 2 and 3 must be added when manure is applied in consecutive years. The cumulative factor is used when manure is applied at about the same rate for 3 consecutive years or longer.

****** Average inorganic nitrogen availability based on the typical soil and climate conditions when considering additions due to precipitation, dry deposition, and foliar absorption versus losses due to volatilization and denitrification (10% denitrification loss is included). The permittee may choose to use this average value for all fields or may adjust the N availability based on site specific soil conditions using the tables below **under paragraph 23.c.2.**

2. Field Specific Availability Factors for Inorganic Nitrogen.

For ammonia and nitrate nitrogen factors, the permittee may choose to use the average value for all fields under paragraph C.1. above, or may use the alternate factor on a field specific basis using the tables below. The approved factors for each field will be included in the O&M Manual.

C. SPECIAL CONDITIONS (continued)

23. Plant Available Nitrogen Procedure (continued)

c. Plant Available Nitrogen (PAN) Availability (continued)

2. Field Specific Availability Factors for Inorganic Nitrogen. (continued)

Table A. Alternate Field Specific Availability Factor for Surface Application

Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat Poorly drained	Poorly drained
	% of inorganic N (manure., precip.) available				
< 2	71	66	62	56	45
2-5	66	60	56	49	30
> 5	63	56	49	38	19

Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook(AWMFH),April 1992, Tables 11-6 and 11-8.

Table B. Alternate Field Specific Availability Factor for Sub-Surface Injection or Immediate Incorporation.

Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat Poorly drained	Poorly drained
	% of inorganic N (manure., precip.) available				
< 2	89	84	78	70	57
2-5	84	76	70	62	38
> 5	80	70	62	48	24

Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook(AWMFH),April 1992, Tables 11-6 and 11-8.

d. Soil Residual Nitrogen (SRN).

1. For Annual Crops, the nitrogen availability from soil organic matter must be included based on soil CEC and crop season as follows:

SRN in pound N/acre* = [percent organic mater] x Soil Availability Factor

Soil Availability Factor
by Soil CEC Ranges and Organic Matter

Growing Season	Organic Matter	CEC ≤ 10	CEC 10-18	CEC >18
Summer	1%	40*	20	10
Winter	1%	20*	10	5

***Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pounds nitrogen for summer and 30 pounds for winter.

2. For Perennial Crops the SRN is considered zero(0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.

C. SPECIAL CONDITIONS (continued)

23. Plant Available Nitrogen Procedure (continued)

e. Conversion Factors for laboratory testing results:
[mg/L or mg/kg or ppm] x [conversion factor] = [pounds per Unit Volume]

Unit Volume	Conversion Factors
lbs/acre inch	0.226
lbs/1,000 gallons	0.0083
lbs/100 cubic feet	0.0062
lbs/ton (wet wt)	0.002

f. Crop nitrogen requirements shall be based on University of Missouri publication, Soil Test Interpretations and Recommendations Handbook, as revised or one of the other reference publications listed in this permit. Alternate reference publications may be used only upon prior approval by the department and shall be listed in the approved Operation and Maintenance Manual.

g. If a crop is not harvested, the PAN rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.

h. PAN calculations for land used for grazing cattle shall include both manure additions by cattle and crop nitrogen consumed by the cattle based on actual cow days per acre/year. This permit does not authorize grazing of cattle where prohibited by state statute under Chapter 350 RSMo.

i. PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.

j. Alternate nitrogen availability factors may be considered based upon site-specific conditions for each field and submittal of scientific justification. Alternate factors will be reviewed and approved by the department as part of the Operation and Maintenance Manual.

k. Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.

l. Primary reference publications used herein are:
1. Livestock Waste Facilities Handbook, Midwest Plan Service, MWPS-18, April 1993.
2. National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
3. Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc., 1991.
4. Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December, 1992.
5. Plant Available Nitrogen Procedure, Missouri Department of Natural Resources, Water Pollution Control Program, April, 1998.

24. Operation and Maintenance Manual
The permittee shall develop, maintain and implement an Operation and Maintenance (O&M) Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to the departments' Water Pollution Control Program and Regional Office for review and approval. The O&M Manual shall include, but not limited to, the following:

C. SPECIAL CONDITIONS (continued)

24. Operation and Maintenance Manual (continued)

a. Detailed topographic maps of the property showing all land application fields including the identification numbers for each field and tract. For spray irrigation systems, each irrigation run shall also be shown. Each field, tract and irrigation run shall have an identification number for record keeping and tracking purposes. The maps shall also indicate separation distances from streams, ponds, wells, and property lines and shall indicate areas exceeding 10 percent slopes and other areas that are not suitable for land application. The maps shall also include the location of all buildings, pump stations, earthen storage basins, storage structures, containment structures, irrigation pipelines, irrigation riser connections, underground terrace outlets, composting areas, dead animal storage or disposal areas, domestic wastewater treatment systems and other waste handling units.
b. Start up procedures, field supervision during operation, and shutdown procedures of irrigation equipment.
c. Procedures for providing the separation distances required by this permit and as specified in 10 CSR 20-8.020 (15) (B).
d. Sample collection, preservation, and testing procedures.
e. Procedures for determining Plant Available Nitrogen (PAN) loading rates.
f. Record keeping forms for tracking each field, tract and storage structure. This shall include testing results, crops, yields, and application rates for each field. Records for each field and tract shall include dates and amounts applied.
g. A procedure for promptly reporting spills or discharges to the permittee plant manager and to DNR.
h. A procedure for recording repair work on gravity sewer lines, recycle lines, and irrigation lines to include the reason for the repair work and the material used for the repair.
i. A program to eliminate debris and blockages of sewer lines and recycle lines and to keep debris out of storage structures.
j. A procedure for twice per day visual inspections of the complete waste collection, flushing and recycle system for overflows or other operational problems.
k. A program for routine, unannounced inspections of land application sites and records to ensure that all directives for land application from the permittee’s central office are being followed. Records of the inspections shall be maintained by the permittee and made available to the department upon request.
l. A procedure to assure that all appropriate employees are properly trained in operation of the waste systems and are familiar with the O&M Manual.
m. Procedure for adjusting application periods and rates based on soil infiltration capacity, soil moisture content, and percent of soil field (saturation) capacity.
n. List of number, size, and capacity of waste removal, hauling and land application equipment.
o. Number of suitable days each year when land application will occur based on historical one in ten year wettest precipitation and capacity of spreading equipment and personnel available.
p. Procedure to avoid application if there is a weather forecast for significant precipitation within 24 hours.

C. SPECIAL CONDITIONS (continued)

25. Underground Tile Outlets at Land Application Sites
    a. Any underground tile outlets from field terraces or subsurface field drainage tiles shall be shown on the site maps for all land application sites.
    b. To prevent potential discharge of wastewater during irrigation of fields with underground tile outlets for terraced fields, the permittee shall either cap the inlets at the fields during irrigation, provide a 150 feet grass buffer area between the inlets and wetted irrigation area, use subsurface injection type application equipment or install secondary containment structures below the tile outlets.
    c. The Operation and Maintenance Manual shall include specific operating details for these fields to prevent discharge of wastewater during wastewater irrigation or leaching of nitrogen through the soils and into the tile drainage system.

26. Between June 1 and November 30 of each year, the lagoon cells shall be lowered to their respective minimum operating levels as specified in this permit or to a combination of levels which equals the storage volume of all three cells combined.